

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jpfa



Treatment of intrabony defect with PRP: Case report



Patchava Mohana Krishna [a,*], *N. Babitha* [b]

[a] *Department of Periodontics, People's Dental Academy, Bhopal, India*
[b] *Department of Periodontics, People's College of Dental Sciences, Bhopal, India*

ARTICLE INFO

Article history:
Available online 24 June 2015

Keywords:
Growth factors
DFDBA
Periodontal regeneration

ABSTRACT

Reports suggest that platelet-rich plasma (PRP), presumably high in levels of platelet growth factors, may enhance the formation of new bone when used in combination with autogenous graft material. This case series presents clinical and radiographic results of three wall intrabony periodontal defects treated with PRP and demineralized freeze dried bone allograft (DFDBA). The patient had reported with three wall intrabony defect in relation to #33. On surgical treatment with PRP and DFDBA, six months follow up revealed a significant progress in reduction of PPD and RAL gain. Therefore, it could be concluded that PRP is clinically and radiographically effective in the treatment of intrabony defects.

Copyright © 2015, Pierre Fauchard Academy (India Section). Publishing Services by Reed Elsevier India Pvt. Ltd. All rights reserved.

1. Introduction

The paramount goal of periodontal treatment is to attain healthy periodontium and maintain the natural dentition in health and function. This can be attained by various conventional periodontal treatments combined with regenerative periodontal therapies. However, conventional open flap debridement falls short of regeneration tissue destroyed by the disease.[1]

Therefore, a different approach to periodontal regeneration is the use of polypeptide growth factors along with the conventional therapy. These factors are abundant in alpha granules of platelets and modulate cell behavior. Platelet rich plasma is an autologous source of platelet derived growth factors that are obtained by sequestering and concentrating platelets by centrifugation[2] of patient blood.

DFDBA have been used for the treatment of intrabony defects since decades and demonstrated a significant amount of bone fill, probing depth reduction and attachment level gain.[3] These allografts contain bone morphogenic proteins, which aids in differentiation, migration and attachment of mesenchymal cells and also in osteogenesis. DFDBA has both osteoinductive and osteoconductive activity and ability to create and maintain the space for regeneration.

The purpose of this study was to examine the clinical and radiographic effectiveness of autologous PRP when combined with decalcified freeze-dried bone graft material in the treatment of intrabony periodontal defects in humans.

2. Case report

The following was the case in which PRP and DFDBA were used to treat the periodontal intrabony defect.

* *Corresponding author.*
E-mail address: drmohanakrishna@gmail.com (P. Mohana Krishna).
http://dx.doi.org/10.1016/j.jpfa.2015.05.004
0970-2199/Copyright © 2015, Pierre Fauchard Academy (India Section). Publishing Services by Reed Elsevier India Pvt. Ltd. All rights reserved.

2.1. *Case*

A 38-year-old nonsmoking male patient with no systemic illness had come to the clinic with a chief complaint of bleeding gums. He was diagnosed with chronic generalized periodontitis and deep pocket of 15 mm was found on the distobuccal aspect of 33. Intraoral periapical radiograph revealed a vertical defect of 3 mm. As the conventional open flap technique would not be sufficient for treatment of intrabony defects, we had decided to use DFDBA along with PRP.

3. PRP preparation

Thirty minutes before surgery 10 ml blood was drawn from the patient through a venipuncture. 2 ml citrate anticoagulant solution was mixed with the patient's drawn blood and processed with a centrifuge for 10 min at 2400 revolutions per min to separate the PRP and platelet-poor-plasma (PPP) from the red blood cell fraction. PRP and PPP were centrifuged again at 3600 rpm for 15 min to separate PRP from PPP. PRP was collected and immediately before mixing with bone graft and application at the site, 10% calcium chloride solution was added to the PRP.[4]

4. Surgical procedure

Surgical Procedure was performed under local anesthesia. Sulcular incisions were made and mucoperiosteal flaps were raised on the both buccal and lingual aspect of the teeth.

After thorough soft tissue debridement, the surgical area was rinsed with saline prior to defect fill with graft material. Placement of DFDBA and PRP mixture at the site was done.

After grafting flaps were repositioned to obtain interproximal closure as much as possible. The flaps were sutured with 4–0 silk using vertical mattress and single interrupted sutures as necessary. Periodontal pack was placed. Suitable antibiotics, analgesics and anti-inflammatory medications were prescribed as required. Subjects were to rinse with 0.2% chlorhexidine gluconate mouth rinse twice daily for first 2 weeks following the surgery and were instructed not to brush or floss for 2 weeks at the site of surgery. Sutures were removed after 8 days. Patient recalled once a month for 6 months post-surgery for oral hygiene reinforcement and oral prophylaxis. The patient was recalled again at the end of 6 months and necessary clinical and radiographic parameters were recorded.

5. Results

This case resulted in significant reduction of pocket depth and gain of clinical/relative attachment level. Re-evaluation at 6 months follow-up after periodontal surgery revealed reduction of PD from 15 mm to 6 mm (Fig. 1). Other clinical parameters like bleeding on probing; gingival margin level and plaque index had been improved when compared to the baseline. The radiographic changes were even significant with an average of 2 mm bone fill at the site (Fig. 3). Radiographs were standardized using radiographic grid with 1 mm calibrated markings and paralleling cone technique (Fig. 2).

6. Disscusion

Periodontal therapy should not be pertained only to arrest the disease progression but also should regenerate the lost tissue where appropriate. For this numerous treatment modalities and techniques had been developed worldwide. Moreover, different materials and combination of materials had been tried successfully.

The use of PRP has been advocated to enhance the healing of soft tissue and bone fill by release of autologenous growth factors. PRP is an autologous source of growth factors such as platelet-derived growth factors, vascular endothelial growth factor and transforming growth factor, which were derived by sequestering and concentrating platelets by centrifugation. Marx R E et al first explored the possibility of using PRP along with bone grafts in intrabony defect treatment procedures. And he also mentioned that bone maturation increases by 1.6–2.1 times with PRP when compared to bone graft alone technique at 6-month postoperative follow-up.[5]

DFDBA has successfully demonstrated significant improvement in both soft and hard tissue parameters in the treatment of periodontal intrabony defects.[3] DFDBAs have both ostioconductive and ostioinductive properties which



Fig. 1 – Pre-operative and post-operative PPD (probing pocket depth).

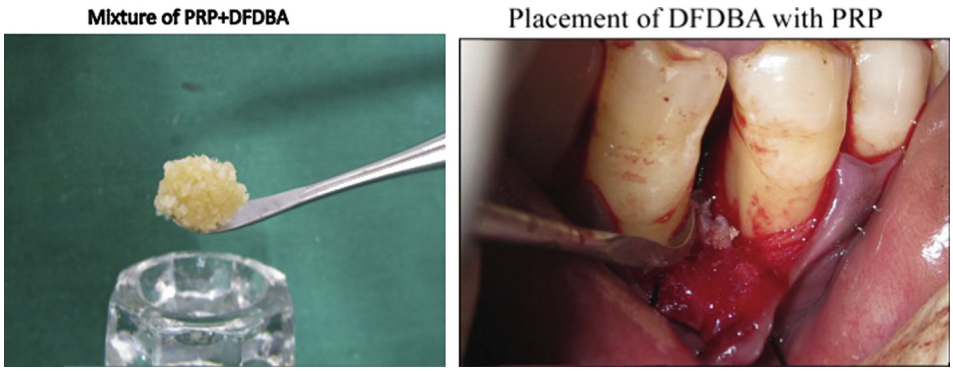


Fig. 2 – PRP + DFBDA mix and placement of bone graft at the defect site.

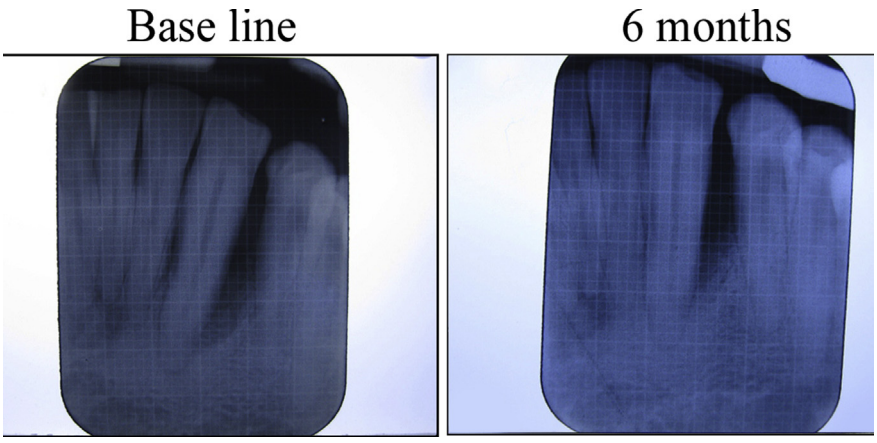


Fig. 3 – Pre-operative and post-operative (6 months) radiographs.

aids to create and maintain space. The bone morphogenetic proteins in DFDBA aids for mesenchymal cell migration, differentiation and osteogenisis. The main challenge in regenerative procedure is to maintain the space for the periodontal ligament cells to migrate into their position.[2] Hence, for growth factors to exert their potential a medium is required to provide the space. Therefore, combination of PRP with DFDBA may provide the wound space for cell induction and differentiation.

The present study therefore, was performed to evaluate PRP mixed with DFDBA in the treatment of intrabony defects. Significant reduction of pocket depth and gain of clinical/relative attachment level and other clinical parameters like bleeding on probing; gingival margin level and plaque index had been improved at 6 months follow-up when compared to the baseline.

Richardson et al[6] and Bender et al[7] found similar results with RAL gain and PD reduction when treated periodontal intrabony defects with DFDBA with PRP at 6 months post-operative follow-up. They found RAL gain of 2.6 mm and PD reduction of 2 mm. In this study the hard tissue fill was 2 mm at 6 months follow-up. This was in accordance with the studies done by Matteo piemontese et al[3] Okuda et al[8] and Wiltfanfg et al.[9] However, the results from some controlled clinical studies evaluating the effect of combination of PRP with bone substitutes in periodontal regenerative therapy are controversial. Even the concentration of PRP plays an important role in maintaining the viability and proliferation of the alveolar bone cells. Low PRP concentrations (1%–5%)[10,11] accelerate the regeneration where as higher concentration leads to suppression of alveolar bone cell proliferation. Aghaloo et al study failed to show either radiographic or histomorphometric progress in bone formation with addition of PRP.[12]

7. Conclusion

From the present study it could be concluded that PRP is effective clinically and radiographically in the treatment of periodontal intrabony defects. PRP is an autologous source of various growth factors found to enhance the regeneration of bone and economical when compared to many other regenerative techniques. However, further comparative clinical trails and histological studies with large sample size are required to clarify the benefits of PRP.

Conflicts of interest

The authors have none to declare.

REFERENCES

1. Polson AM. Introduction. In: Polson AM, ed. *Periodontal Regeneration: Current Status and Directions*. Quintessence Publishing Co, Inc.; 1994:179–198.
2. Wikesjo UME, Selvig KA. Periodontal wound healing and regeneration. *Periodontol 2000*. 1999;19:21–39.
3. Piemontese Matteo, Domenico Simone. Treatment of periodontal intrabony defects with demineralized freeze-dried bone allograft in combination with platelet rich plasma: a comparative clinical trial. *J Periodontol*. 2008;79:802–810.
4. Tozum TF, Demiralp B. Platelet rich plasma: a promising innovation in dentistry. *J Can Dent Assoc*. 2003;69:664.
5. Marx RE, Carlson ER. Platelet rich plasma: growth factor enhancement for bone grafts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1998;85:638–646.
6. Richardson C, Mellonig J, Brunsvold M. Clinical evaluation of bio-oss. A bovinederived xenograft for the treatment of periodontal intra osseous defects in humans. *J Clin Periodontol*. 1999;26:421–428.
7. Bender SA, Rogalski JB, Mills MP. Evaluation of demineralized bone matrix paste and putty in periodontal intraosseous defects. *J Periodontol*. 2005;76:768–777.
8. Okuda K, kawase T, momse M, et al. Platelet rich plasma contains high levels of platelet derived growth factor and transforming growth factor and modulates the proliferation of periodontally related cells in vitro. *J Periodontol*. 2003;74:858–864.
9. Wiltfang J, Kloss FR, Kessler P, et al. Effects of platelet rich plasma on bone healing in combination with autogenous bone and bone substitutes in critical size defects. An animal experiment. *Clin Oral Implant Res*. 2004;15:187–193.
10. Kassolis JD, Reynolds MA. Evaluation of the adjunctive benefits of platelet rich plasma in subantral sinus augmentation. *J Craniomaxillofacial Surg*. 2005;16:280–287.
11. Rodriguez A, Anastassov GE, Lee H, Buchbinder D, Wettan H. Maxillary sinus augmentation with deproteinated bovine bone and platelet rich plasma with simultaneous insertion of endosseous implant. *J Oral Maxillofac Surg*. 2003;61:157–163.
12. Aghaloo T, Moy PK, Freymiller EG. Investigation of platelet rich plasma in rabbit cranial defects: a pilot study. *J Oral Maxillofac Surg*. 2002;60:1176–1181.

PFA MISSION

The purpose of the Academy as an honour society shall be the elevation of dentistry to the highest degree of professionalism attainable as made manifest by the practice of integrity and ethics. The academy shall position itself to accomplish this mission by publicly honouring in a significant and noteworthy manner those practitioners who exemplify these ideals. The Academy shall further expand the accomplishment of this stated purpose by creating a Fellowship, the selection to which in itself become an honour. The selection of Fellows commensurate with the honour-fellowship ideal shall be the practice of all sections. It is through this purpose in deed and action that the causes, aims and objective of the Academy for the benefit of dentistry and the society that it serves will be achieved